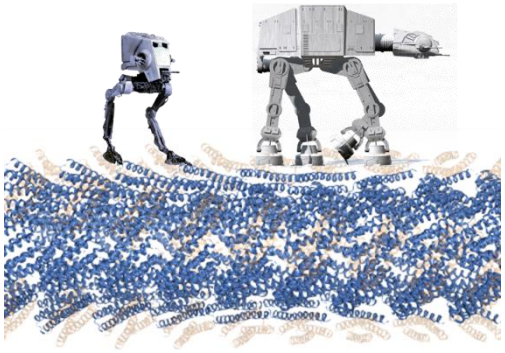
A PhD student position on the topic on *de novo* protein design is available in the Ljubetič group at the National Institute of Chemistry in Ljubljana, Slovenia

Designing dynamic and controllable feet for a *de novo* protein robot



Proteins are nature's nano-robots, catalysing reactions, recognising molecules, and transporting cargo. Biomimetic nanomachines have the potential to solve current real-world problems, however use is limited by existing folds and inadequate stability of natural proteins. *De novo* designed proteins are hyper-stable and can achieve properties and shapes not explored by evolution.

CC-TRIGGER-FEET will combine protein engineering with state-of-the-art deep learning techniques and wet-lab experiments. PhD student will construct dynamic heterodimeric protein elements whose binding state will be controlled either through protein phosphorylation or coiled-coil strand displacement. Half of the "foot" will be rigidly attached to de novo designed fibres. All components are genetically encodable, potentially enabling the designed feet to function in living cells.

Now is the perfect time to be a protein designer! PhD student will use latest protein design methods, that are very transferable to other fields. RFDiffusion and AFDesign will create rigid scaffold connections. ProteinMPNN will be used to design side chains. Rosetta and Alphafold2 will be used for filtering. One of the key innovations is the application of cutting-edge AI protein design methods to design multistate assemblies and molecular robots. Molecular robots have the potential to solve many pressing problems from drug delivery in precision medicine to self-healing and self-cleaning materials. Some of our recent publications include: Ljubetič, Nature Biotechnology, 2017; Ljubetič, Curr. Opinion Struct Biol, 2017; Drobnak, JACS, 2017; Aupič, Nature Communications, 2021; Linder, Nature Machine Intelligence, 2022;

You must have:

- Masters degree in biochemistry, biotechnology or related sciences
- A high level of self-motivation, enthusiasm, and curiosity
- Interest in combining computational and wet-lab approaches
- Excellent verbal and written communication skills in English

Nice to have:

- Experience with programing languages and tools (python, bash, git)
- Experience with structural biology software (Pymol, Chimera etc…)

What we offer:

- A collaborative environment within a diverse and enthusiastic research group
- Cutting edge research projects and mentoring
- State-of-the-art computing and experimental infrastructure
- PhD program at University of Ljubljana
- Employment for at least 4 years
- Life in Ljubljana, one of EUs safest and greenest capitals, with public healthcare and schools

How to apply:

Apply here: www.ki.si/scientists4future/application-form/ by **15th May 2023**. Choose PhD program in Biomedicine and topic number 19 (CC-TRIGGER-FEET). Any proof of English proficiency will be accepted. Starting date is in September 2023. For more information, please contact dr. Ajasja Ljubetič at ajasja.ljubetic@ki.si.

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NATIONAL INSTITUTE OF CHEMISTRY

Scientists 4Future Slovenia

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